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REMARKS/ARGUMENTS

In reply to the Office Action mailed May 9, 2005, Applicants respectfully request reconsideration and allowance. In the Office Action, claim 11 was objected to and claims 1-19 were rejected for anticipation and obviousness. In reply, Applicants have amended claims 6-12 and 18. Claims 1-19 remain pending in the subject application.

In the Office Action, claims 18 and 19 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,960,624 (the "Blotenberg patent"). Applicants have amended claim 18 to further clarify the nature of the claimed subject matter. Before explaining how the amended claim distinguishes over the prior art, an explanation of the invention follows.

A third stage separator vessel typically comprises several cyclonic devices for separating catalysts from a catalyst-laden gaseous stream such as flue gas from a regenerator vessel of a fluid catalytic cracking unit. A power recovery system such as a turbine expander may be placed in downstream gaseous communication with the third stage separator to receive gas purified of catalyst solids to recover some of the high pressure energy contained in the flue gas.

Proper design of the gas delivery equipment is essential to protecting the power recovery system, particularly the blades of the expander. Cold wall piping comprises a refractory lining on the inside of a metal pipe to insulate the pipe from the hot gas carried therein to minimize thermal expansion. Cold wall piping is not typically specified between the TSS vessel and the expander turbine inlet due to concerns of spalling refractory lining entering the expander turbine and damaging the blades. Hot wall piping, which may be made of stainless steel, without refractory lining thermally expands over five times as much as cold wall piping. The large thermal expansion associated with hot wall piping systems results in significantly higher piping loads that must be accommodated in the design of the piping components and equipment. Invariably, this leads to added cost for support and installation. Additionally, the rotor of the turbo expander turbine may not be allowed to exceed a maximum velocity or the blades could detach from the rotor.

The power recovery unit provides extra power to other equipment when needed such as an air blower shaft or an electrical generator, or both. If the power recovery unit produces more energy than is required by the other equipment, the machine may act as a generator and feed power into the refinery power grid. Feeding power into the refinery power grid acts as a braking mechanism and provides some over-speed protection. Given an electrical breaker disconnect from the power grid, a fast acting over-speed valve and bypass conduit or line around the power recovery unit may be required to rapidly divert flue gas around the expander turbine to limit the rotational velocity of the expander turbine. Additionally, diverting a portion of the flue gas around the expander turbine through the bypass conduit may be necessary to control the pressure in the upstream catalyst regenerator. However, as the bypass valve opens, the flow of hot flue gas would cause the hot wall piping to rapidly heat up and thermally expand. The resultant pipe

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expansion would impose a great deal of force loading and rotational moment on the expander turbine inlet line. The loading and moment on the expander turbine inlet must be relatively small to ensure that the housing of the expander turbine does not deform which could promote the blades to brush with the inner surface of the casing. Additional equipment, engineering design and construction installation labor, would be required to ensure that expansion of the bypass conduit does not translate to a load on the expander turbine inlet line that is in excess of the nozzle loading limits.

Generally speaking, the present invention is a system for separating particulate solids from a contaminated gas stream and recovering energy from the contaminated gas stream, typically a hot flue gas stream from a catalyst regeneration vessel. A TSS vessel has a main inlet for receiving gas laden with solids. A plurality of cyclones in the TSS vessel separates the solids from the gas. A solids outlet from the TSS vessel dispenses solids from the TSS vessel and two main clean gas outlets remove clean gas from the TSS vessel. A first main clean gas outlet from the TSS vessel delivers clean gas to a power recovery unit. A second main clean gas outlet from the TSS vessel is transported through a bypass conduit that bypasses the power recovery unit and mixes with the effluent clean gas from the power recovery unit.

If the actual flowing volume of the clean gas in the main clean gas conduit exceeds a level at which the power recovery unit is rated, a valve in the bypass clean gas conduit is opened to a proportional degree, so a portion of the clean gas being directed to the power recovery unit can be re-directed to bypass the power recovery unit, and maintain proper pressure control of the FCC regenerator and avoid mechanical damage to the power recovery expander. The bypass clean gas conduit is anchored on the TSS vessel instead of on the main clean gas conduit to the power recovery unit, so sudden exposure of the bypass clean gas conduit to hot gases and its concomitant rapid thermal expansion will not suddenly impose a load or moment on the power recovery unit beyond allowance. Hence, equipment, engineering, and installation labor necessary for neutralizing such effects are not necessary. Moreover, because the bypass clean gas conduit does not join with a conduit to the power recovery unit, the bypass clean gas conduit may be lined with insulating refractory to minimize thermal expansion thereof without fear that spalling refractory will damage the power recovery unit.

The Blotenberg patent teaches a system that still has the disadvantages that the claimed invention overcomes. In the Blotenberg patent, the bypass lines D6 and C5 are anchored on the main clean gas conduit A3. Therefore, according to current specifications for power recovery equipment, bypass conduits D6 and C5 will have to be hot wall conduits without refractory to insulate the conduit metal material from the hot gaseous contents transported therein. Hence, bypass conduits D6 and C5 would have to be installed with expensive equipment to accommodate rapid thermal expansion which, if not managed correctly, could exert a moment on the turbine expander 7 via lines B4 and turbine exhaust conduit which is not numbered in the figure in the Blotenberg patent.

Claim 18 has been amended to recite a first clean gas stream is transported "from a first main clean gas outlet of said separator vessel to a power recovery unit" and a second

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clean gas stream "from a second main clean gas outlet of said separator vessel" is intermittently mixed "with said first clean gas stream withdrawn from said power recovery unit." The Blotenberg patent does not disclose this arrangement and embodies the disadvantages that the claimed invention overcomes. Applicants respectfully request reconsideration and withdrawal of the rejection for anticipation of claims 18 and 19.

Claims 1-4 were rejected under 35 U.S.C. §103(a) as being obvious over the Blotenberg patent. The rejection acknowledges that the Blotenberg patent is silent as to a first main clean gas outlet and a second main clean gas outlet. Applicants respectfully point out that the Blotenberg patent is also silent as to "said unit outlet being in downstream communication with said second main clean gas outlet." The rejection cites no motivation from the reference to support the *prima facie* case of obviousness, but just mentions that:

It would have been obvious to someone of ordinary skill in the art at the time of the invention to substitute a first main clean gas outlet of the separator(31) connected to the unit inlet and a second main clean gas outlet of the separator(31) connected to the unit outlet for the branched clean gas outlet of Blotenberg to provide for an equivalent distribution of clean gas throughout the system but without use of excessive valving structures.

Action, page 4. Applicants respectfully submit that the motivation cited is merely a recitation of the advantages of the claimed system which is improper hindsight and certainly no sufficient motivation to support a *prima facie* case of obviousness. Even if it was obvious to use two main clean gas outlets, which Applicants respectfully submit that it is not, it would not routinely follow to connect a second main clean gas outlet from the separator to an outlet from a power recovery unit. Applicants respectfully request reconsideration and withdrawal of the rejection for obviousness of claims 1-4. At least for the same reasons, Applicants respectfully submit that claim 5 is also patentable.

Claims 6-10 and 12 were rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent 4,279,624 (the "Wilson patent") in view of U.S. Patent 2,941,621 (the "Dyge patent"). Applicants have amended claim 6 to recite a system including a vessel comprising a first main clean gas outlet "in communication with an inlet to a power recovery device and said second main clean gas outlet being out of communication with said power recovery device." Support for this amendment is found at page 16, lines 10-11 of the subject application. The Wilson and Dyge patents do not address communication between the third stage separator and a power recovery device. Moreover, none of the cited references teaches first and second main clean gas outlets with only one of them being in communication with a power recovery device. Claim 11 has been amended to replace previous recitations with recitation of "at least one of said first and second main clean gas outlets are defined by said vessel below said tube sheet" which is taken out from claim 6 because it is not needed for the patentability of claim 6. The amendment also overcomes the objection to claim 11. Applicants respectfully submit that independent claim 6 is distinct and patentable over the references cited. At least for the same reasons, Applicants respectfully submit that claims 7-12 depending from claim 6 are also patentable at least for

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the same reasons as claim 6 is patentable and that the objection to claim 11 has been overcome.

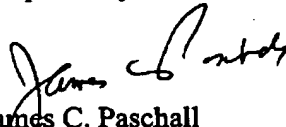
Claims 13-17 have been rejected for being obvious over the Blotenberg patent in view of the Wilson patent. The rejection acknowledges that the Blotenberg patent is silent as to the vessel including a plurality of cyclones, a tube sheet and a main solids outlet in communication with the cyclone solids outlet and asserts that the Wilson patent teaches these internal devices. The rejection further acknowledges that the Blotenberg patent is silent as to a first main clean gas outlet and a second main clean gas outlet. The rejection just goes on to say without any support from the references that:

It would have been obvious to someone of ordinary skill in the art at the time of the invention to substitute a first main clean gas outlet of the separator(31) connected to the unit inlet and a second main clean gas outlet of the separator(31) connected to the unit outlet for the branched clean gas outlet of Blotenberg to provide for an equivalent distribution of clean gas throughout the system but without use of excessive valving structures.

Action, sentence bridging pages 7 and 8. The rejection points to no teaching in the references that equivalent distribution of clean gas throughout the system is desired by one of ordinary skill and simply borrows the motivation to avoid the use of excessive valving structures from Applicants' disclosure. No teaching is identified in the cited references which would suggest using a first main clean gas outlet in communication with a power recovery device and a second main clean gas outlet in communication with a bypass conduit which bypasses the power recovery device as recited in claim 13. Applicants respectfully submit that the rejection does not provide a *prima facie* case of obviousness with respect to claim 13. Applicants also respectfully submit that at least for the same reasons, claims 14-17 which depend from claim 13 are also not obvious.

Applicants respectfully request reconsideration and allowance of all the claims 1-19 pending in the subject application for the foregoing reasons.

Respectfully submitted,


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